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April 18, 1959

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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



WALTER M. SCHIRRA

Space for Seven

See Page 243

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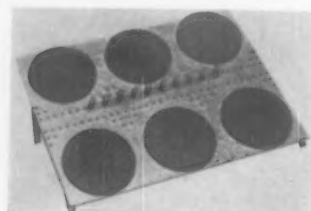
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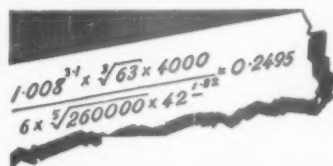
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ASTRONAUTICS

Pick First Space Men

Exceptional intelligence and physical fitness qualify seven test pilots for making the United States' first space flight when the time comes.

See Front Cover

► A COMBINATION of exceptional intelligence and physical fitness has earned each of the seven Project Mercury Astronauts the chance to be the first United States man in space.

Although only one can be first, each of the six remaining men will later circle the earth in a space capsule.

Each man has a minimum I.Q. of 130, Brig. Gen. Donald D. Flickinger, surgeon and assistant deputy commander for research, Air Research and Development Command, said.

In addition, each man is a physical "Mr. America." Three are Air Force, three are Navy and one is a Marine pilot. Each has had 1,500 hours of flying time. They range in age from 32 to 37, and all are married and family men.

The men are married, probably, because they are all good looking, personable, intelligent young Americans that one would expect to be married at their ages, Dr. W. Randolph Lovelace II, director of the Lovelace Foundation for Medical Education and Research, Albuquerque, N. M., explained.

The men have undergone tests to determine their ability to survive emotional and physical stresses and combinations of these. Each of the volunteers is over the age of

30 because it takes years to acquire the technical knowledge in astronomy, navigation and the basic sciences plus experience required for this first manned space flight, Capt. Norman Lee Barr, director of the Astronautical Division, Navy Bureau of Medicine and Surgery, said.

The space man's physical examination was by no means limited to such familiar measurements as those of pulse, blood pressure, chest X-ray, hearing and vision.

His intestines, sinuses, spine, stomach, esophagus, teeth and heart were also X-rayed. Moving pictures were taken of his heart. All sorts of laboratory tests were made on his blood, urine and excrement. Eyes, ears, heart, nerves and muscles were subjected to a large number of new tests and measurements.

Of prime importance in the selection process was the way the space candidate endured the kinds of stress he might encounter.

He was put on a tilt table and tipped up at queer angles for 25 minutes. He was taken to a simulated altitude of 65,000 feet in a partial pressure suit and kept there for an hour while measurements were made of his heart and breathing.

He was put in a dark, soundproof room for three hours to test how he would adapt to the hushed loneliness of outer space. He was subjected in a centrifuge to multiple

g's such as he might encounter in a space blast-off. He was put in a heat chamber at a temperature of 130 degrees Fahrenheit to see what would happen if atmospheric friction should heat the space capsule to hellish extents. Measurements were also made of his reactions to rotation, vibration, noise (especially to high frequency tones) and to plunging his feet suddenly into a tub of ice.

The candidate's personality and emotional soundness were evaluated by means of standard personality and psychological tests. Special aptitudes were tested with engineering, mechanical comprehension, mathematical reasoning and other special tests.

There was no passing or failing mark set for these tests. Rather, the evaluation of each man was based upon comparison of his performance with that of the others.

The first man will orbit the earth two or three times for a total of three to four and one-half hours. This will not occur until at least 1961, when chances for a safe return will be virtually certain.

The Project Mercury Astronauts shown on the cover of this week's SCIENCE NEWS LETTER are Lt. Cmdr. Walter M. Schirra, USN; Lt. Cmdr. Alan B. Shepard Jr., USN; Capt. Virgil I. Grissom, USAF; Capt. Donald K. Slayton, USAF; Lt. Col. John H. Glenn Jr., USMC; Lt. Malcolm S. Carpenter, USN; and Capt. Leroy G. Cooper Jr., USAF. Headquarters for their training will be at NASA Space Flight Activity, Langley Field, Va.

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PSYCHOLOGY

Mice Used to Study Stress Faced by Space Crews

► MICE HAVE been kept "in solitary" to study the "terror of loneliness" that space crews will have to face.

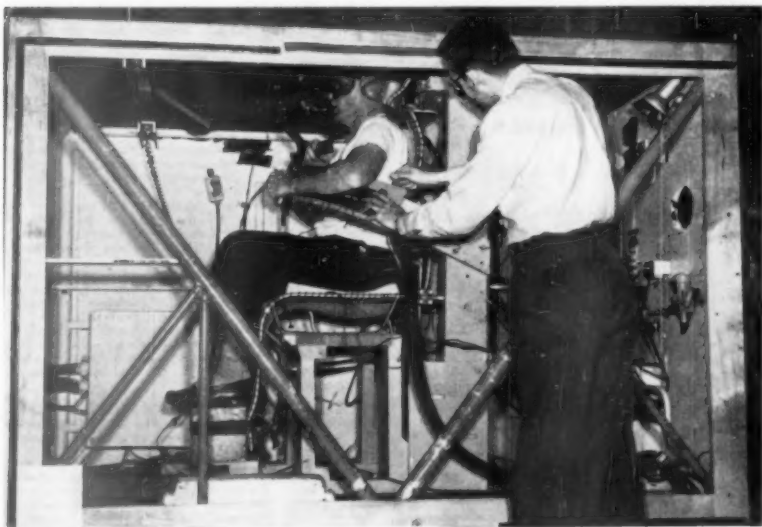
After several days the animals become very agitated and neurotic, Dr. T. C. Barnes of Hahnemann Medical College reported to the Eastern Psychological Association meeting in Atlantic City.

The tranquilizer drugs may help to counteract the damaging effects of solitude, but they do produce drowsiness. Thorazine suppressed 70% of the neurotic behavior in the mice, 90% of the convulsive movement and made 20% of the mice sleepy. Miltown suppressed only 11% of the neurotic behavior in mice, 42% of the epileptic behavior and caused sedation in 50%.

Three kinds of isolation that produce neurosis or psychosis in humans were described by Dr. Barnes. In the first kind there is a reduction of all kinds of signals to the senses, as when the individual is immersed in water at body temperature in a dark and soundproof tank. This kind of solitary confinement produces temporary psychosis in 36 hours.

In another type, all meaning is taken out of seeing and hearing by having the individual wear translucent goggles and by masking the sounds with noise. In the third kind there is an imposed structuring of the signals to the senses, as there is with a polio patient in an iron lung.

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GRAVITY FORCES—Marine Corps Lt. Col. John H. Glenn Jr. prepares to take a test to measure his abilities to cope with multiple gravity forces. He is attended by Dr. Evan Lindberg of the Wright Air Development Center, where the test was conducted in the Wright centrifuge.

PSYCHOLOGY

Mind-Body Reactions

Current research reported at the Eastern Psychological Association meeting describe such things as the relation between mind and body and the development of perception.

► YOU CAN learn to avoid an annoying noise without being aware of your action.

This "unconscious learning" was reported to the Eastern Psychological Association meeting in Atlantic City, N. J., by Dr. Ralph F. Hefferline of Columbia University.

In Dr. Hefferline's experiment, he told his subjects he was studying changes in body tension when noise was occasionally superimposed on music. Semi-classical music and a loud generator hum were fed through earphones. But he arranged his apparatus so that a small contraction of the right thumb would turn off the noise for 15 seconds.

The effective contraction was too slight to be visible to the experimenter and was not noticed by the subject. Yet after a half hour, subjects learned (were conditioned) so that they sometimes prevented the noise for several consecutive minutes.

Hearing-Personality

► DEAFNESS lowers a person's score on the Rorschach inkblot test of personality, Dr. Carl Eisdorfer of Duke Medical Center, Durham, N. C., told the meeting.

This was shown when 48 elderly people, aged 60 and older, were tested in the Duke Geriatrics Project, Dr. Eisdorfer reported.

Although hearing loss was found to be associated with lowered Rorschach scores, loss of vision accounted for relatively little difference in the level of Rorschach functioning. Individuals with both hearing and vision loss, however, scored slightly below those having a hearing loss alone.

Important for any interpretation of Rorschach performance is a consideration of any loss of hearing by the persons tested, Dr. Eisdorfer warned.

Babies Perceive Depth

► DESPITE the usual opinion of parents, little babies can perceive depth as soon as they can crawl.

This was reported to the Association by Drs. Richard D. Walk and Eleanor J. Gibson of Cornell University.

In their experiment, babies were allowed to crawl on a large sheet of glass. Directly under part of the glass sheet was a pattern of linoleum. Under the rest of the glass sheet, the linoleum was three and a half feet lower. The two sheets of linoleum had the same pattern on them.

The babies would crawl across the linoleum just under the glass sheet but would not cross the other linoleum three and a half feet below them, thus indicating that they were able to see and avoid depth.

► SO FAR as his hearing acuity is concerned, the future space traveler may be placed in his capsule sitting straight up, tilted to one side or the other, lying on his face or his back or on either right or left side.

None of these positions has any real effect on the threshold of his hearing, Drs. John F. Corso and Moira F. LeMay of the Pennsylvania State University reported to the psychologists.

This finding, the investigators said, removes one worry from further consideration by those who are designing space ships and other kinds of vehicles.

The results contradict findings recently reported by Russian investigators.

Alert Lookout

► A REMEDY has been proposed for the deterioration of efficiency when a lookout is watching for something that occurs only once or twice an hour.

Feed the lookout artificial signals even if he can easily distinguish them from the "real thing," urged Dr. F. V. Taylor of the U. S. Naval Research Laboratory, Washington, D. C.

When 96 such artificial signals were presented randomly mixed with the 2.5 real signals, the monitoring performance was improved more than 100% and there was no deterioration during the whole two-hour period, Dr. Taylor reported to scientists at the Eastern Psychological Association meeting.

Heart Beats Faster

► ALTHOUGH a man does not have much control over the speed of his heartbeat, it can be conditioned to beat faster on certain occasions.

Dr. Malcolm R. Westcott of Vassar College told the meeting how this can be done.

Without any learning, a man's heart will naturally beat faster when he receives an electric shock. In Dr. Westcott's experiment, such an electric shock followed immediately after a seven-second buzzer. After ten such trials, the buzzer alone caused the heart to speed up its beating.

Such conditioning of the human heartbeat has been observed before, but because the record of the breathing masked the effects on the heart, the results previously have been contradictory.

Dr. Westcott controlled the breathing so that this factor could be allowed for and the conditioning of the heartbeat clearly demonstrated.

► THE ENGINEER'S IDEA of a creative college is one who is independent of others.

This was discovered when Dr. Thomas B. Sprecher of the Psychological Service of Pittsburgh asked practicing engineers to rate other engineers on their creativity and then had them explain the reasons for their high and low ratings.

He reported his findings to the Psychological Association.

Other traits of the engineer's creative engineer are: production of novel solutions, ability to get a solution, enjoyment of problems, tendency to give practical answers and tendency to analyze a situation.

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CHEMISTRY

Coenzyme A Synthesized

Coenzyme A, believed to be related to the vitamin B complex, has been successfully synthesized more than ten years after the discovery of this vital material.

► THE CHEMICAL synthesis of a complex natural substance, needed by every cell of all living things, has been achieved.

Hailed as a significant advance in the quest for a complete understanding of life processes, the test tube production of coenzyme A was described by Drs. John Moffatt, and H. Gobind Khorana, University of British Columbia, at the American Chemical Society meeting in Boston.

A way to make coenzyme A has eluded chemists ever since the vital material was discovered in 1945. The British Columbia scientists had been working on the project for about seven years. The total synthesis has opened a whole new field of biochemical research into life processes.

Some scientists regard the availability of the coenzyme as having special significance for the important study of nucleic acids. These acids are the basic cell mate-

rials for every living thing, and determine the characteristics of the cell.

The chemical triumph has earned high praise from other outstanding scientists. The discoverer of coenzyme A, Nobel laureate Dr. Fritz Lipmann of the Rockefeller Institute for Medical Research, New York, observed:

"This feat is a beautiful piece of chemical artistry in putting together a most complex biochemical unit."

Although less complicated than the enzymes with which it works, coenzyme A is an elaborate arrangement of carbon, sulfur, nitrogen, phosphorus, oxygen and hydrogen atoms linked together. Part of the coenzyme A molecule is pantothenic acid, a growth factor which is part of the vitamin B complex. In fact, the coenzyme is thought to be the biologically active form of pantothenic acid.

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a "greater reduction of spontaneous activity of mice." Also anesthesia induced by these two drugs was effective for a longer time when nicotinamide was given. Drs. Robert M. Burton, Washington University School of Medicine, St. Louis, Nathan O. Kaplan, Brandeis University, Waltham, Mass., and Abraham Goldin, National Cancer Institute, Bethesda, Md., reported results of their research to scientists attending the American Chemical Society.

Previous research had shown that giving nicotinamide results in a large increase of the coenzyme diphosphopyridine nucleotide (DPN) in an animal's tissues.

DPN is involved in many of the body's reactions, the scientists said, and the high concentration obtained with nicotinamide may be related to the increased tranquilizing effect it causes.

The researchers found it was necessary to give the vitamin at the same time as the drug or four hours after to get maximum effects. Giving it four hours before did not increase DPN levels.

These studies may provide more information on how tranquilizers work, and result in tailor-made drugs.

"Since mental health is the chief medical problem today, the study of neurochemistry assumes considerable importance," the chemists pointed out.

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CHEMISTRY

Discoveries in Chemistry

Chemists are continually adding to the number of drugs man has to combat disease and pests. Some of the new ones are adding to our knowledge of how the body functions.

► A LIVING insecticide which will not harm man, animals, or plants was announced at the American Chemical Society meeting in Boston, Mass. Called Thuricide, it is made from the living spores of the microorganism *Bacillus thuringiensis* Berliner.

Dr. Robert Fisher, Bioform Corporation, Wasco, Calif., called volunteers for his clinical studies "pioneers," because no such previous experiments had been made. The U. S. Food and Drug Administration on Dec. 10, 1958, temporarily allowed the chemical to be tried on humans because scientific data showed "the proposed use as a pesticide is without hazard to health."

Thuricide is the first microbial insecticide to receive such a recognition of safety.

Muscle Relaxant

► A NATURAL PROTEIN-FREE substance has been found that causes muscles to relax.

The finding of this substance may help scientists to understand diseases where muscle relaxation is not normal. Drs. Charles J. Parker Jr. of Massachusetts General Hospital and John Gergely of Harvard University told the meeting.

The two biochemists had shown last year that the chemical system for relaxing muscles has three different components. Further studies have shown that when all three of these elements are together, the new-found substance can be extracted, and made to prevent the contraction of muscle threads.

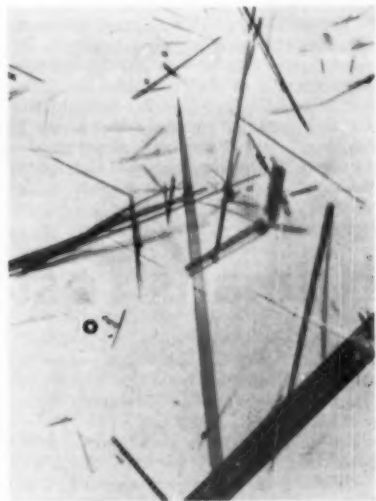
The discovery is important for understanding the basic chemical mechanism by which muscles contract and relax, Dr. Gergely said. Muscle action can be either reflex or voluntary, he explained, but the chemical action within the cells is the same in either case, and the extracted substance seems to be the basic controlling factor.

It is known the extract is protein-free and has no tissue or cells, but it has not yet been named, and further studies must be made to determine its characteristics.

Tranquilizing Drugs

► NICOTINAMIDE, an essential vitamin used in the treatment of pellagra, increases the tranquilizing effects of certain drugs, three researchers reported.

Tests with laboratory animals showed that when the vitamin was given together with reserpine or chlorpromazine, there was



DEPRESSION DRUG—These crystals, seen through the microscope, show the fine structure of a new drug for overcoming severe mental depression. The new compound, called Niamid, was described to the American Chemical Society by a team of scientists at Chas. Pfizer and Co., Inc. The drug is more potent and much less toxic than others currently available to physicians, animal tests indicate. Extensive clinical trials of Niamid are now underway. However, the drug is not yet available for general use by the medical profession.

MEDICINE

Study Drugs, Healing

► A CHEMICAL present in small amounts in celery aids the normal sun tanning process in humans and helps protect against excessive sunburn.

Known as 8-MOP (8-methoxypsoralen), it is most prevalent in the fruit of an Egyptian plant and was originally used to treat patients suffering from vitiligo, a disease that causes areas of the skin to appear bleached.

Dr. Francis P. Rhoades, a Detroit physician, described the chemical to family doctors at the American Academy of General Practice Scientific Assembly in San Francisco.

Sunlight activates production of the skin pigment melanin. When 8-MOP is taken two hours prior to exposure, Dr. Rhoades said, the skin's physiological reaction is altered as certain layers are thickened and the body's output of melanin is increased.

Dr. Rhoades said there is a "definite need" for agents that will combat the effects of damage caused by light rays that produce chemical changes. 8-MOP is commercially available in capsules or tablets.

Clean Wounds

► THERE IS LITTLE, if any, reason to keep clean surgical incisions bandaged for more than a few days, a Des Moines surgeon reported to the Assembly.

In a controlled study of 211 patients with 222 clean surgical wounds, Dr. Louis T. Palumbo, clinical professor of surgery at the State University of Iowa College of Medicine, treated half the wounds in the

conventional manner, with 90% of the bandages removed by the end of the eighth day following surgery.

Bandages from the other 111 wounds were removed at varying intervals between six hours and 48 hours after surgery.

Complications were minimal and almost identical in both groups, Dr. Palumbo stated. The unbandaged incisions appeared to heal faster with less local inflammation and no adhesive irritation.

Furthermore, none of the test patients objected to seeing the unbandaged wounds. Most of them seemed eager to watch the incisions heal.

Penicillin Reaction

► PERSONS who have an allergic reaction to penicillin may now be helped by a drug that curbs such reactions.

At least five to ten out of every 100 Americans have an allergic reaction to penicillin, a drug second only to aspirin in daily use. Symptoms include hives, swelling, fever and exhaustion.

Dr. William Strauss of New York City told scientists at the American Academy of General Practice that the new drug is effective in 93% of the reaction cases. The drug is marketed under the trade name, Neutrapen.

The number of persons allergic to penicillin is increasing from one to two percent each year, Dr. Strauss reported, due to widespread medicinal use and increased exposure to non-therapeutic sources of penicillin.

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MEDICINE

Humans Test Cancer Drugs

► AT THIS very moment in clinics throughout the United States, some 85 chemical compounds that have exhibited anti-tumor activity are cautiously being tested on human cancer patients.

All of these drugs could prove to be beneficial. Likewise, none of them may make the grade that eventually would place them among the approximately 20 drugs now used by physicians in this country to combat tumor growth.

Some or even all of the drugs may prove to be too toxic, or poisonous, for the patients. The tumor cell may die, but not before the patient.

This problem of toxicity, plus the cancer patient's ability to build a resistance to the drug, were explained by Dr. Sidney Farber of Children's Hospital, Boston, to science writers at a seminar in Excelsior Springs, Mo. The seminar is sponsored by the American Cancer Society.

"We do not have a rational approach to the cancer problem. We do not have a chemical formula that will knock out cancer," Dr. Farber said. Therefore, chemicals that exhibit any activity against the growth

of tumors are screened with the hope that one will prove beneficial in man, he explained.

The screening program itself is a joint effort of the National Cancer Institute, the Veterans Administration, the Atomic Energy Commission, industry, the Damon Runyan Memorial Fund, and the Food and Drug Administration. The nucleus of the program is located at the National Institutes of Health in Bethesda, Md.

This past year alone it tested between 35,000 and 40,000 potential cancer killers, Dr. Stuart Sessoms of NIH said.

Initially, six tests in mice are done on any material that promises to arrest three cancer growths, one type of leukemia, a sarcoma and a carcinoma. If the agents chosen prove active against any one or all of these types, they are then subjected to more experiments with other laboratory animals. In this manner, investigators determine just how these agents attack the malignant growths, what bad effects they cause, and the amount of each drug that can safely be given to the animal without killing it.

It takes about six months for this process, and more than 90% of the materials are rejected at this stage, Dr. Sessoms explained.

However, those few that do make the grade, and this year more than 70 did, are cautiously evaluated in clinical trials on patients in clinics throughout the U. S.

Some of the agents now on trial were developed by scientists in an attempt to develop new and more effective anti-cancer drugs. A few are submitted by the drug industry. Others come from Government laboratories, universities and research organizations. They include synthetics, plant extracts, natural products, antibiotic filtrates and hormones.

Because the three mouse cancer growths used initially to determine a drug's anti-tumor activity may not necessarily be the best challenge with which to test a drug against human cancers, a program is now underway to use tissue cultures as a test. Thus, some of the drugs that fail in the initial test on mice may be considered, not rejected.

Meanwhile, there is a slim chance that one of the 85 agents now at the clinical trial level may find a place in the chemotherapy regimen of the cancer patient.

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HORTICULTURE

Machine Measures Lawn Wear-and-Tear

► "HOW WILL it look after everyone has tramped on it? How will it stand up under wear?"

These are the nagging questions that a backyard gardener, proudly surveying his newly-planted lawn, sometimes asks himself.

The problem is even more pressing for managers of golf courses, football fields, parks, playgrounds, and other public places, where energetic youngsters and their athletic elders trample, scuff, spike, tear, and dig into the grass.

Part of the problem would be solved if gardeners could measure accurately how different types of grass stand up under heavy wear. So far, such measurements have been made only by sight comparison.

Now, however, Prof. Russell L. Perry, an agricultural engineer at the University of California, Los Angeles, has devised a simple and ingenious research machine to measure turf grass wear resistance.

The present model, first of its kind, includes four revolving corrugated wooden feet which simulate severe scuffing, two rollers covered with golf shoe spikes, and a slanting wheel similar to a golf cart wheel.

Preliminary tests, in which the grass in the test area is scuffed down until the stems are just above the ground, have been run by Dr. Victor B. Younger, assistant professor of ornamental horticulture at UCLA.

The tests indicate that among the most common grass varieties used on home lawns, tall fescue show the strongest wear resistance, and seaside bent the least. Among Bermuda grasses, tifgreen seemed the most, and U-3 the least, durable.

Science News Letter, April 18, 1959

GENETICS

Genetic Clue to Diseases

Human defects such as Mongoloid idiocy, genetic intersexes and, possibly, leukemia may be caused by abnormalities in the number of chromosomes an individual has.

► **CHROMOSOMES**, the microscopic threads that carry the genes of heredity, may be the cause of serious human ills.

A team of British researchers reports in the British medical journal, *The Lancet*, that irregularities in the number of chromosomes an individual has may lead to Mongoloid idiocy, abnormalities of the sex organs and, possibly, leukemia.

In a complex process involving making cell cultures from human marrow, treating the cells to make them expand and then staining the chromosomes inside the cells at a critical stage in chromosome duplication, the scientists were able to "map" the chromosomes. They found derangements in the sex chromosomes and, they believe, in the number of body chromosomes.

In two genetic intersexes, or humans with sex abnormalities, the researchers found some sex chromosomes were definitely deformed or missing.

An extra chromosome, believed to be nonsexual, was found in the six Mongoloids studied. Instead of the normal number of 46 chromosomes, these individuals had 47. However, the researchers report, it was so small that the Mongoloids could live although with impaired faculties.

The problems faced by cell researchers, or cytologists, in studying and mapping chro-

somes are very complex. It is still not known how much variation there can be in a "normal" individual. However, on the basis of studies made so far at the University of Colorado Medical Center, Denver, by Drs. T. T. Puck, Arthur Robinson and J. H. Tjio, there appears to be an exceedingly high degree of uniformity in the chromosome make-up of normal individuals. The researchers are currently working on the relationship between chromosomal abnormalities and genetic disease.

As yet no one has been able to determine the location of genes responsible for human genetic diseases except for some that are sex-linked, such as color-blindness.

The chromosome mapping reported by the British research team, headed by Dr. Charles E. Ford, British Medical Research Council at Harwell, and Prof. L. S. Penrose, University College, London, may be an extremely important step in this direction.

The technique they used, based largely on the work of such researchers as Prof. T. C. Hsu of the M. D. Anderson Hospital, Houston, Texas, and Dr. Tjio of the Colorado Medical Center, may provide important clues to the causes of many serious diseases and defects.

Science News Letter, April 18, 1959

CHEMISTRY

New Chemical Products

► **FOAM PLASTIC** smoke may soon be used for tracing rockets and satellites.

This prediction was made by the inventor, Miss Betty Lou Raskin, Johns Hopkins University, Baltimore, Md., at the American Chemical Society meeting in Boston, Mass.

The smoke is composed of minute foam particles, which could be metallized. This reflecting material could then follow a rocket or satellite and make possible greater echoing for radar tracking of these targets.

"Since it is believed that these particles will not simply float in space, but, because of their electrical charges, will be in some kind of orbit, smoke distortion patterns produced by rockets and satellites might also be found to have scientific value," she said.

The strategic placing of metallized particles above the ionosphere, the layer of the upper atmosphere that reflects radio waves, might improve radio communication. As cloud-seeding agents, the foamed smokes have several advantages over the commonly used silver iodide crystals. They also might prove valuable as a shield to protect ground personnel from thermal radiation emanating from experimental nuclear blasts, Miss Raskin said, adding:

"Since urethane foams have good thermal insulating properties, and since the resulting smokes have unusually slow settling rates, another application could be to protect crops against low temperatures in a manner similar to that for which carbon smoke from smudge pots is now used. They also should make efficient carriers for relatively large quantities of insecticides."

The toxicity of these smokes has not yet been thoroughly investigated, but the particle size suggests they would be filtered out by the human nose, and once the particles are well-dispersed in the air, their chances of causing physiological damage is minimized.

Throw-Away Bathing Suit

► **THE CHEMICAL** industry may soon be making bathing suits to throw away after a single use, scientists were told today at the Chemical Society meeting.

Dr. L. Shailer Jr. of B. F. Goodrich Chemical Company introduced a symposium on nonwoven fabrics by discussing the many engineering possibilities of man-made fibers. The growing desire for lighter weight,

easier-to-care-for garments has encouraged the search for chemical compounds which can be made into inexpensive disposable items, Dr. Shailer said.

Cleaning cloths, tissues, towels and napkins have already found widespread acceptance, and the favorable heat, sound, and mechanical properties of the nonwovens promise use in the automotive industry as padding in car doors.

The textile industry is not alone in the nonwoven field. The chemical industry is expanding production of nonwoven fibers, and the paper industry may soon be entering the field, Drs. Willard Carlson and Kenneth Arnold reported for St. Regis Paper Co.

The development of plastics has allowed paper makers to use fibers not derived from wood, and these synthetic fibers can be modified to produce fibers from a paper-making machine which are suitable for garments.

Science News Letter, April 18, 1959

SURGERY

Heart Massage Technique Is Available to All GPs's

► **THE TECHNIQUE** of heart massage is being taught in community centers to doctors who did not learn the method in medical school.

Heart massage now saves many cardiac arrest victims, Dr. William H. Snyder of Los Angeles pointed out to colleagues attending the 11th annual scientific assembly in San Francisco of the American Academy of General Practice. In fact, the technique is now taught to all medical students.

With the aid of a series of diagrams, Dr. Snyder showed doctors the life-saving incision and surgical separation of the ribs that enable the doctor to grasp the heart gently and massage it to simulate normal pumping action.

Serious brain damage can occur if heart massage is not started promptly, he added.

Dr. Snyder urged that all doctors learn the heart massage technique and be prepared to act quickly when a sudden and unanticipated emergency arises.

Since the earliest days of surgery, doctors have struggled to prevent sudden, unanticipated deaths in the operating rooms and emergency wards. Sometimes, for no apparent reason, the patient's heart simply stops. The surgeon must be ready to cope with these cases of "cardiac arrest," he said.

Surgery in the heart is now considered to be an everyday procedure in most medical centers, Dr. Norman E. Shumway of Stanford University School of Medicine added.

Within 20 years of the dawn of clinical heart surgery, direct vision or open-heart operations have become a reality. Much of this progress has been made possible by artificial heart-lung machines and clinical techniques that reduce body temperature during surgery.

The first "blue-baby" operation was performed in the early 1940's. This operation diverts part of the system's blood flow into an infant's lungs and has saved thousands of infants.

Science News Letter, April 18, 1959

PHYSIOLOGY

Placenta Blood Pressure Indicates Pregnancy Time

► **STUDY OF** the blood pressure in a pregnant monkey's placenta may soon be providing researchers with important information on human pregnancies.

So far, measurements of placental blood pressure appear to be good indicators of the "immediate course" of the pregnancy, Dr. Elizabeth M. Ramsey of Carnegie Institution of Washington reported.

During a contraction at the beginning and end of pregnancy, the blood pressure in the placenta and the amniotic cavity (where the fetus lies) is almost double that observed during mid-pregnancy, she told the American Association of Anatomists meeting in Seattle, Wash. This is another indication of the greater muscular activity of the uterus during early and late pregnancy, Dr. Ramsey explained.

Experiments with blood pressure recorders showed pressure differences between the mother animal's arterial circulation and placental circulation. This is believed to be further proof that pressure differences are responsible for keeping blood circulating through the placenta, Dr. Ramsey said.

Observations in human pregnancies indicate that conditions are closely comparable to those in the rhesus monkey so that the monkey can be used as a "yardstick" for the human. Studies with the monkey may help scientists understand normal prenatal development of the human infant as well as the abnormalities leading to miscarriages, stillbirths and malformations.

Science News Letter, April 18, 1959

ELECTRONICS

Electronic Reliability Is Key to Space Success

► **CHANCES** of getting future space travelers back to earth alive depend on the ability to solve the problem of producing reliable electronic equipment.

The United States has the technical competence required to develop and produce all the hardware necessary for interplanetary flight, but success in space will depend on the ability to make that equipment work when it is supposed to work and under the conditions for which it was designed to work.

These opinions were expressed at the Society of Automotive Engineers National Aeronautic meeting in New York by J. M. Wuerth, chief reliability adviser of Autonetics, a division of North American Aviation, Inc.

Successful space flight will require a degree of reliability impossible to obtain without first providing production consistency, he said. Reliability is the "key to the space age and consistency is the production man's key to reliability."

The technology of reliability is based on the mathematics of probability, he said, and the concept of Mean-Time-Between-Failures assumes the occurrence of failures in a purely random manner.

But despite the practical value of these concepts, it must not be assumed that failures occur without cause. Stringent reliability requirements compel us to find reasons for unreliability and correct them rather than take the easy way out by calling them random failures.

When practicable, said Mr. Wuerth, production processes will have to be mechanized. Where this is not practicable, workmen will have to be motivated to provide the utmost in careful workmanship.

Mr. Wuerth advocated a strengthening of inspection, control and screening processes, and further refinement in measurement standards.

Science News Letter, April 18, 1959

PHYSICS

Atomic Power Converted Directly to Electricity

► **DIRECT CONVERSION** of atomic to electric power has been achieved at Los Alamos, N. M., using a thermocouple composed of uranium and a gas, cesium.

The process also has direct application to space travel and power for satellites, Dr. Robert W. Pidd, University of Michigan physics professor, said. He reported that the method eliminates virtually all but the nuclear reactor in the production of electric power from fission.

The simple device was tested for the first time on April 3. Its development stems from the discovery last July that a very hot gas could be substituted for one of the metals in a thermocouple to improve greatly its current-generating efficiency.

Dr. Pidd reported the process would:

1. Cut by perhaps one-half the present cost of building power reactors.
2. Pave the way for interplanetary space travel because of the possible reduction in dead weight load of fuel now needed to propel a rocket into space.
3. Allow equipping satellites with a small but powerful and long-lasting electricity source for telemetering data.

The electric power is obtained from a nuclear reactor containing a uranium carbide source surrounded by a plasma of hot, ionized cesium gas. When the reactor is turned on, atomic fission causes the uranium to undergo such an energy release that a current is produced. The current is transmitted by the cesium gas to a collector from which the electricity can be extracted.

A piece of uranium about one-third the size of a cigarette has been used in this manner to light a bulb for 12 hours, although originally it had been expected to stay lit for only a few minutes.

Group leaders for the project, sponsored by the Atomic Energy Commission at Los Alamos Scientific Laboratory, was Dr. George M. Grover of the University of Michigan. Drs. Ernest W. Salmi, also of the University of Michigan, and John R. Reitz, physics professor at Case Institute of Technology, Cleveland, also worked on the project.

Science News Letter, April 18, 1959

IN SCIENCE

BIOCHEMISTRY

Tobacco Smoke May Alter Body Protein, Life Span

► **HEAVY SMOKERS** may have a shortened life span because of the protein-changing ability of tobacco smoke.

Acetaldehyde, used in perfumes, is also present in tobacco smoke and apparently reduces longevity by stiffening connective tissues, Dr. F. Marott Sinex and Barbara Faris, Boston University School of Medicine, said at the American Chemical Society meeting in Boston, Mass.

Acetaldehyde is so reactive that the moment a puff of smoke enters the lungs, the chemical seeks to combine with proteins.

Dr. Sinex exposed kangaroo tail tendons to water and passed them through puffs of cigarette smoke. It took the tendons 20 times longer to shrink when in the presence of the smoke. This could be analogous to the stiffening of tissues found in aging bones, skin, blood vessels, and especially lungs, Dr. Sinex explained.

Kangaroo tendons were chosen because they have the purest bulk source of the important body proteins collagen and elastin. Elastin is the chief protein component of lungs and blood vessels. Protein is chemically the same anywhere in the living body and presumably reacts the same regardless of location, Dr. Sinex said.

He also suggested a process which might counteract the adverse effects of tobacco smoke.

The amino acid cysteine is capable of reversing the stiffening action of cigarette smoke, and might protect smokers from injurious effects of compounds such as acetaldehyde. But the amount necessary at the moment to give protection would induce serious physiological consequences, Dr. Sinex cautioned.

Science News Letter, April 18, 1959

BIOCHEMISTRY

Find Crystal Structure Of Part of Gene Carrier

► **THE CRYSTAL** structure of one part of the material believed to store and transport genetic information from generation to generation has been found.

Three scientists report that they have determined the crystal structure of calcium thymidylate, the calcium salt of thymidylic acid that makes up a part of gene-carrying deoxyribonucleic acid. The studies were aimed at explaining the link between the biological role of deoxyribonucleic acid and its molecular structure.

Drs. P. Horn and V. Luzzati of the Macromolecule Research Center, Strasbourg, and Dr. N. K. Trueblood of the University of California, Los Angeles, report their studies in *Nature* (March 28).

Science News Letter, April 18, 1959

THE FIELDS

MEDICINE

New Milk Protein May Solve Gelling Problem

► A NEW PROTEIN in milk discovered by U. S. Department of Agriculture researchers may help solve the problem of "gelling."

After storage, some concentrated milks that have been heat-sterilized form a jelly-like mass. USDA researchers have found that while calcium can cause gelling of concentrated milk, the addition of the new protein keeps the milk fluid.

Basic research on milk proteins has shown that casein, which makes up 80% of the protein, is a mixture of at least three proteins with different properties. Now researchers have found at least five proteins go into alpha-casein. The newest of these five, alpha-z-casein, is the one that may be important in stabilizing milk's calcium-casein complex.

Alpha-z-casein has only 0.1% phosphorus instead of the 0.85% found in most of this protein.

Studies at the USDA's eastern utilization division, Philadelphia, Pa., have contributed greatly to knowledge of milk's chemistry.

Science News Letter, April 18, 1959

GENERAL SCIENCE

FTC Rules Against Water Softener Claims

► THE FEDERAL Trade Commission has ruled against the claims made by a manufacturer for its water conditioning device.

FTC has ordered Evis Manufacturing Co., San Francisco, to stop falsely claiming that its water conditioning device will "solve hard water problems, make hard water soft, remove unpleasant odors or flavors from water, save soap and reduce cost of heating water and cause dishes or glassware to dry without leaving water stains," among other claims.

In a 12-page opinion released on a complaint filed Feb. 5, 1954, the Commission ruled that evidence given by scientists in support of the charges clearly outweighs testimony given by users who testified for the company.

The opinion, written by Commissioner Sigurd Anderson, reversed the hearing examiner's initial decision which recommended dismissal of the complaint for failure of proof.

"The hearing examiner," the opinion said, "has given little weight to the evidence received in support of the complaint. In many instances of tests or studies being made, he questions the results because of the doubt raised on cross examination about whether the Evis unit was properly installed . . ."

"The scientific evidence and testimony support the allegations of the complaint,

and it is substantial. This evidence is strong, clear and persuasive. Taken altogether it would be of compelling significance under any circumstances."

The decision has been noted by observers as representing an about-face for FTC. In a decision on a case involving the controversial battery-additive product AD-X2, FTC considered findings by the National Bureau of Standards but, in the light of testimony given for the product by users, dismissed charges of false advertising against Pioneers, Inc., of Oakland, Calif. (See SNL for 1953, July 4, p. 6-8, July 18, p. 39, Nov. 28, p. 339, Dec. 5, p. 358.)

A battery of experts testified that the pipe-like water conditioner device did not detectably change the specific gravity, boiling point, viscosity or surface tension of the treated water. Commissioner Anderson noted that witnesses for the company conceded that the device worked in a mysterious way.

Science News Letter, April 18, 1959

MEDICINE

Surgery and Radiation Used for Breast Cancer

► A DOUBLE-BARREL surgical-radiation technique has been developed for treating breast cancer.

Drs. Richard D. Brasfield and Ulrich K. Henschke, both of New York City, reported at the American Radium Society meeting at Hot Springs, Va.

After a radical mastectomy, or surgical removal of the breast, an incision is made between two ribs exposing one of the major arteries leading to the breast. The artery is tied off, a slit is cut into it, and a small nylon tube is inserted. The open end of the tube is brought out through the skin.

When the patient is back in her room, a wire made of a radioactive isotope (iridium-192 or cobalt-60) is slipped into the tube and left there until the required radiation dose is reached. The radiation kills cancers that have spread to the lymph nodes along the arteries.

The relationship between the physician and the patient undergoing radiation treatment for cancer is an essential factor in the end result.

The quality of the physician-patient cooperation often determines the degree of success or failure, Dr. Howard H. Ashbury, Staunton, Va., told physicians at the Radium Society meeting.

"Such a relation is psychologically complex," he said, "in that the participants are equally dependent upon each other. Not only does the patient need healing, but the physician needs to heal the patient, and a successful resolution of the treatment situation brings mutual rewards to both."

One especially important point the physician must realize, Dr. Ashbury said, is that "there is a discrepancy between what the patient expects and what the doctor can accomplish which is unavoidable in our present state of knowledge."

Science News Letter, April 18, 1959

MEDICINE

Irradiated TB Vaccine Said to Be Promising

► PRELIMINARY experiments with animals have indicated that a new tuberculosis vaccine made from irradiated TB germs holds promise.

This report is made by Dr. Charles M. Carpenter, A. W. C. Naylor-Foote, Dr. George V. Taplin, Dr. Carl A. Lawrence and Clifford L. Drake at the University of California Medical Center, Los Angeles.

The new vaccine afforded protection against tuberculosis in mice and guinea pigs comparable to that of the BCG vaccine, which contains modified living tuberculosis bacteria.

The UCLA vaccine, which is treated with radioactive cobalt, is thought to offer several advantages over the BCG vaccine. BCG is used widely in several countries but has not been accepted in this country because it is believed that the live germs in the vaccine might be a clinical threat.

Exposure of the TB bacteria to cobalt irradiation inactivates the organism so that it is not capable of infection, but at the same time results in minimal structural and chemical changes in the organism. Thus the ability of the vaccine to stimulate antibodies against invading TB germs is preserved at near maximum.

Science News Letter, April 18, 1959

GEOPHYSICS

Scientists Measure Range in Antarctic

► A RANGE OF Antarctic mountains whose exact location has been undetermined for 20 years has been measured by a U. S. research team, the National Science Foundation has reported.

The mountains, known as the Executive Committee Range, are located in the heart of Marie Byrd Land and were first sighted from the air during a 1939-40 expedition. At that time four peaks were discovered, but neither location nor heights could be determined. A second air sighting occurred in 1947.

On the basis of flights made last December, however, it was decided that vehicle approach to the mountains was practical, and a team set out on a three-week, 500-mile trek this February.

The party found the range trends north and south for about 60 miles, between 76 degrees 20 minutes south and 77 degrees 20 minutes south. Preliminary geological investigation showed the mountains are volcanic and about 90% covered by snow and glaciers.

The largest of the ten peaks found in the range is 13,856 feet, about 600 feet smaller than Mt. Rainier in Washington.

The party's traverse was part of the continuing program of Antarctic investigations previously conducted during the International Geophysical Year by the U. S. National Committee for the IGY. The program is now coordinated by the NSF.

Science News Letter, April 18, 1959

GENERAL SCIENCE

Land of Milk, Honey and Science

Israel, the fabled land of milk and honey, might better be known today as the land of science, for science is playing an important role in its history.

By BENITA TALL

► **LAND OF THE Bible**, fabled land of milk and honey, holy land for Christians, Jews and Moslems alike, a center of ancient civilizations and a center of tension in today's civilization—these are the terms in which we think of Israel today.

They each neglect an essential aspect of the modern nation Israel: science and technology.

When the nation was established 11 years ago in May, 1948, Dr. Chaim Weizmann, world-famous chemist and first president of Israel, explained that scientists would have to provide their nation with whatever nature had omitted. Resources of the human mind would have to compensate for water shortage, food shortage and, apparently, shortages in the basic materials essential to some degree of national self-sufficiency. The only abundance the new nation had a decade ago is the one it still has—people. However, the human mind is meeting the challenge presented to it.

Scientists are working on the water problem. Wells are being drilled, floods controlled and water brought to the desert. Enough food is being produced to feed the people. And raw materials such as rich phosphates and oil have been discovered. Where a raw material is lacking, wood for pulp to make paper, for example, the scientists and engineers have come up with a substitute.

Science for Today

Israel has had one great advantage in its scientific progress as a nation that must be mentioned. It could take immediate advantage of the elaborate technology and a wealth of scientific knowledge that exists in the world. Israel did not have to go through an industrial revolution or overcome an anti-science attitude of a government or people. It could and did learn from the technological growing-pains of other nations.

In considering the scientific progress Israel is making it is important to look at the country's geography and its economic status.

As a Middle Eastern country Israel has certain specific problems in agriculture, medicine, power for industry and in trade. Each new crop its scientists develop as suitable for cultivation in Israel could be considered throughout this area with its extremely limited agriculture. This means that Israel serves as a model for what science and technology can achieve in the Middle East.

As an underdeveloped country Israel also is a model for Africa and Asia in its scientific development. Its studies of industry

and heavy machinery, setting standards, education and the acquisition of a trained body of engineers, technicians and scientists are being watched and, in some cases, copied by other nations.

The establishment of national standards in foods, building materials and dozens of other consumer products is interesting for an "outsider" to observe.

In the United States we tend to accept these standards as absolute: All bricks in the world that have a certain specified composition of clay and are of a certain size are grade A. However, standards are not absolute. As Mr. Y. Ben-Sira of the Standards Institution of Israel pointed out, quality requirements and effective inspection systems have to be designed for the special needs of a country.

Thus Israeli grade A bricks will be different from American grade A bricks. Several factors enter into the fixing of these standards. Israeli workers, technicians, and engineers might not be able to meet American standards because of lack of training and experience or equipment, for example.



MODEL RIVER—The 16 miles of Yarkon River are reduced to a 225-foot scale model constructed on top of Mount Carmel at the David T. Siegel Hydraulics Laboratory of the Technion. Scientists are conducting tests in an effort to prevent the periodic floods which transform the river, normally a small stream, into a torrent that menaces life and property.

Materials are different. Environment is different—American grade A bricks might crack under the sub-tropical climate of some parts of Israel.

The fact that industry in Israel is young and rarely scientifically equipped to carry on its own testing and research program has also influenced the make-up and function of the Standards Institution. The Institution's laboratories test thousands of samples each month, checking compliance with standards and also contributing to consumer acceptance and confidence in a product.

Israeli standards are published, Mr. Ben-Sira said, and are gaining international recognition. Standards here are flexible, he explains. As research and testing improves they are revised upward. Again, as with science and technology generally, the new, underdeveloped nations are particularly interested in what Israel is doing in the field.

Water, or rather no water, is a serious problem throughout the arid zones of the world. The solution of this problem is occupying the time of many of Israel's scientists and engineers while the national Government spends large sums on research and development projects. In a very real sense the future of the nation depends on finding more water and controlling it. Recent estimations of the water resources have had to be revised downward, giving added urgency to the problem.

Needed: More Water

At the Technion, the Israel Institute of Technology, engineers are studying ways of bringing water where it is needed, drilling new wells, controlling floods and protecting the water supply.

One of the Technion's most ambitious projects is a "river" built on the Mount Carmel campus. It is a 225-foot model of the Yarkon River near Tel-Aviv. Each contour of the 16-mile river is carefully reproduced along with the topography of the surrounding land. By duplicating flooding conditions, the engineers expect to be able to more effectively control the river and thus save water as well as avoid losses to property and life. Flow from streams and tributaries can be measured, increased, decreased or stopped completely in miniature. Dams or re-channelling can also be studied before tackling the actual river.

The Technion together with the Weizmann Institute and the Hebrew University comprise the three main scientific and technological groups in Israel. Each exemplifies its "species" of institution.

The Weizmann Institute is the epitome of the pure science institution. In its modern, well-equipped laboratories scientists are working on the basic problems in biology, physics, chemistry, mathematics and the other sciences. Sometimes the results of their research may have application to a very real and immediate problem, such as

the cause of cancer. However, the emphasis is on research that will increase our knowledge and understanding.

At the Technion, as one professor explained it, the engineers "do" cheaper and more efficiently what the scientists plan. At Technion City, the new campus being built on Mount Carmel, whole buildings are devoted to problems of sanitation, soil science, water research, building materials research. As a combination teaching-research institution, the Technion also must turn out engineers for the country, "do-ers" who can bring water to deserts, build cities on clay soils, make roads that will not buckle under torrential rains and baking sun, and find and dig for chemicals.

On the stony hills outside of Jerusalem there is a new Hebrew University.

Here the President of Israel teaches, a general of the army takes undergraduate courses. Everyone, it seems, studies, teaches and learns.

"Pure" or "Applied" Science

While it is representative of a teaching institution, the University also is typical of a problem confronting the underdeveloped nations. Currently there is what amounts to a national debate: How much emphasis should a nation such as Israel, with limited funds, etc., spend on pure research?

Many persons, including scientists, believe most of the scientists should be working on concrete problems, concentrating on directed research. This is the only way, these persons say, that the country will advance as quickly as possible.

Whichever aspect of science is stressed in the years to come, a visitor to Israel cannot help but feel that science is a vital part of the nation. There the engineer designing an aerial car to carry fruits down the rocky terraces in Galilee and the scientist studying the virus "blooming" in a tissue culture are equally important.

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Questions

ASTRONAUTICS—What is the minimum I.Q. of the seven astronauts? p. 243.

CHEMISTRY—What is pantothenic acid? p. 245.

How does nicotinamide affect DPN? p. 245.

GENETICS—What relation has been found between chromosome number and Mongoloid idiocy in humans? p. 247.

MEDICINE—Where does a new drug that protects against sunburn come from? p. 246.

Photographs: Cover, Fremant Davis; p. 243, National Aeronautics and Space Administration; p. 245, Chas. Pfizer & Co., Inc.; p. 250, Israel Institute of Technology; p. 256, Eastman Chemical Products, Inc.

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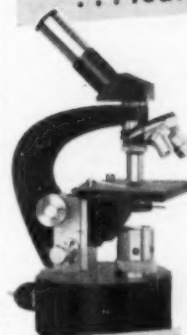


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For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

AIRCRAFT WEIGHT & BALANCE CONTROL—Henri G. D'Estout—*Aero Publ.*, 3rd ed., 128 p., illus., paper, \$3.25. Includes weighing and loading procedures for light airplanes, transports, jets and helicopters.

ALASKA AND SCIENCE EXPERIENCES—Matthew F. Vessel and Herbert H. Wong—*Fearon Publ.*, 14 p., illus., 75¢. Among other things explains glaciers, tundra, the effect of long days and nights, and the effect of cold on living things.

THE ANALYSIS OF MIXTURES OF VOLATILE SUBSTANCES—Emil F. Williams, Ed.—*N. Y. Acad. of Sciences, Annals*, Vol. 72, Art. 13, 234 p., illus., paper, \$4. Monograph discussing gas chromatography as a part of chemical plant process engineering.

ANIMAL CAMOUFLAGE—Adolf Portmann, transl. from German by A. J. Pomeroy—*Univ. of Mich. Press*, 111 p., illus., \$4.50. Of the varied ways in which animals by shape or coloring practice camouflage.

CALL THE DOCTOR: A Social History of Medical Men—E. S. Turner—*St. Martins*, 320 p., illus., \$3.95. A history of British medical practitioners from the late Middle Ages to the welfare state.

CAREERS IN SCIENCE TEACHING—The Future Scientists of America Foundation—*Nat. Science Teachers Assn.*, 18 p., illus., paper, single copies free upon request direct to publisher, 1201 16th St., N.W., Washington 6, D. C.

THE CARIBBEAN: British, Dutch, French, United States—A. Curtis Wilgus, Ed.—*Univ. of Fla. Press*, 331 p., \$5.50. Volume VIII of the Caribbean Conference Series. Educational, economic and population trends in the Caribbean area.

COMMON SENSE AND NUCLEAR WARFARE—Bertrand Russell—*Simon & Schuster*, 92 p., \$2.50. Lord Russell's plan for achieving peace in ways which should be equally acceptable to Communist Nations, to NATO Nations and to uncommitted Nations.

THE DESIGN OF PHYSICS RESEARCH LABORATORIES—Symposium of The Institute of Physics, London—*Reinhold*, 108 p., illus., \$4.50. Of

value to all concerned with the design of science laboratories.

DESIGN OF TRANSISTORIZED CIRCUITS FOR DIGITAL COMPUTERS—Abraham I. Pressman—*Rider*, 316 p., \$9.95. Text for the engineer concerned with the miniaturization of digital computers, emphasizing "worst-case design" techniques.

A DICTIONARY OF ENGLISH SYNONYMS & SYNONYMOUS EXPRESSIONS—Richard Soule, Alfred Dwight Sheffield, Ed., foreword by Edward Weeks—*Little*, 4th ed., 614 p., \$4.95. First published 90 years ago, still a standard work in its field.

A DICTIONARY OF NAMED EFFECTS AND LAWS: In Chemistry, Physics and Mathematics—D. W. G. Ballentyne and L. E. Q. Walker—*Macmillan*, 205 p., \$6. To facilitate quick usage, entries are in alphabetical order, from Abbe's Sine Condition to Weber.

DIFFERENTIAL FERTILITY IN BRAZIL—J. V. D. Saunders—*Univ. of Fla. Press*, 90 p., maps, \$3.50. Demographic analysis of the various segments of Brazil's present population.

EDTA TITRATIONS: An Introduction to Theory and Practice—H. A. Flaschka—*Pergamon*, 138 p., \$6.50. Reference work for analytical laboratories and teachers.

ENDOCRINE CONTROL IN CRUSTACEANS—David B. Carlisle and Sir Francis Knowles—*Cambridge Univ. Press*, 120 p., illus., \$3.75. Monograph on the way in which certain body functions in crustaceans are controlled by chemical substances in the blood stream.

FOUNDATIONS OF MATHEMATICS—Carl H. Denbow and Victor Goedicke—*Harper*, 620 p., \$6. Comprehensive text for one-year course of college mathematics.

THE FOURIER INTEGRAL AND CERTAIN OF ITS APPLICATIONS—Norbert Wiener—*Dover*, new ed., 201 p., paper, \$1.50. Reprint of 1933 edition which was an elaboration of 15-lecture course given at the University of Cambridge.

FREE-LIVING NEMATODES AND OTHER SMALL INVERTEBRATES OF PUGET SOUND BEACHES—Wolfgang Wieser—*Univ. of Wash. Press*, 179 p., illus., paper, \$4. First intensive study of nematodes in any region of the U. S.

THE GIFTED GROUP AT MID-LIFE: Thirty-five Years' Followup of the Superior Child—Lewis M. Terman and Melita H. Oden—*Stanford Univ. Press*, 187 p., \$4.50. This fifth volume of GENETIC STUDIES OF GENIUS answers the question "Have the gifted group in mid-life fulfilled the promise of their youth?"

A GUIDE TO FIELD BIOLOGY—John Sankey—*Longmans*, 166 p., illus., \$2.50. Guide for the scientific study of plants and animals in the field, for boys and girls and the amateur naturalist.

A HISTORY OF WESTERN TECHNOLOGY—Friedrich Klemm, transl. from German by Dorothea Waley Singer—*Scribner*, 401 p., illus., \$6.50. Reveals the forces which guided the development of technical advance by making extensive use of contemporary documents.

HOW DO YOUR CHILDREN GROW?—H. Gerth Morgan and others, foreword by Neva Ross—*Assn. for Childhood Educ.*, 32 p., paper, 75¢. On the assumptions and facts and the interrelationships of learning in school, home and community.

INTRODUCTION TO NUCLEAR POWER COSTS—Arnold Rochman—*Simmons-Boardman*, 50 p.,

paper, \$2.95. Monograph, analyzing the factors which make up the total cost of nuclear power.

JET PROPULSION ENGINES—O. E. Lancaster, Ed., foreword by Theodore von Karman—*Princeton Univ. Press*, 799 p., illus., \$20. After short historical survey, the turbojet, turbo-prop, ramjet, the intermittent jets, and the liquid and solid propellant rocket engines are examined.

THE JOURNALS OF DANIEL NOBLE JOHNSON (1822-1863) UNITED STATES NAVY—Mendel L. Peterson, Ed.—*Smithsonian Inst.*, 268 p., illus., \$4. Journal of a "cruise on the Brazils" and notes while on board the U. S. Schooner Enterprise.

JOURNEY INTO SPACE—Matthew F. Vessel and Herbert H. Wong—*Fearon Publishers*, 14 p., illus., paper, 75¢. Experiments explaining elements of rocket thrust, centrifugal force and gravity, weightlessness and space biology in school.

KOALA BEAR'S WALKABOUT—Anita Hewett—*Sterling*, 32 p., illus. by Anne Marie Jauss, \$2.50. Picture book acquainting young readers with the Australian Koala Bear.

THE LOGIC OF DISCOVERY—Karl R. Popper, transl. from German by author—*Basic Bks.*, 480 p., \$7.50. A scholarly presentation of the logical character of science, doing justice to the liberating effect of the Einsteinian revolution in physics.

MATERIALS FOR ROCKETS AND MISSILES—Robert G. Frank and William F. Zimmerman—*Macmillan*, 124 p., illus., \$4.50. Source of engineering data on the lightweight, high-temperature materials which are now available for rockets and missiles.

MORE ABOUT READING—Margaret Rasmussen, Ed.—*Assn. for Childhood Educ.*, 32 p., paper, 50¢. Collection of articles on individualized and self-selection reading.

MOST-OFTEN-NEEDED 1959 RADIO DIAGRAMS AND SERVICING INFORMATION—M. N. Beitman, Ed.—*Supreme Publications*, 192 p., illus., paper, \$2.50. Circuit diagrams, alignment, and other helpful information.

MYOKINETIC PSYCHODIAGNOSIS: M.K.P.—Emilio Mira Y Lopez, transl. from French by Mrs. Jacques Dubois, foreword by Gordon W. Allport—*Logos Press*, 186 p., illus., \$6.75. M.K.P. is a psychological test which involves the analysis of graphic expression to indicate temperamental and character tendencies.

NATIONAL SCIENCE FOUNDATION PROGRAMS FOR EDUCATION IN THE SCIENCES—Alan T. Waterman, Dir. and Harry C. Kelly, Asst. Dir.—*Nat. Science Foundation*, 28 p., illus., paper, free upon request direct to publisher, Washington 25, D. C. Describes fellowships, institutes, course-content improvement and scientific manpower.

NEW WORLD OF CHEMISTRY—Bernard Jaffe—*Silver Burdett*, rev. ed., 678 p., illus., \$4.96. High school chemistry textbook brought up to date.

OUR LANGUAGE AND OUR WORLD—S. I. Hayakawa, Ed.—*Harper*, 402 p., illus. by William H. Schneider, \$5. Selections from ETC.: A Review of General Semantics, 1953-1958.

PHEASANT BREEDING AND CARE—Jean Delacour—*All-Pets*, rev. ed., 123 p., illus., \$4. Brought up to date, with chapter on pheasants on shooting preserves added.

PIGS, TAME AND WILD—Olive L. Earle—*Morrow*, 64 p., illus. by author, \$2.50. Handsomely illustrated with much information in simple language.

PINEAPPLE TOWN, HAWAII—Edward Norbeck—*Univ. of Calif. Press*, 159 p., illus., \$4. An anthropologist's account of a company town of mixed racial and cultural heritage, of interest to anthropologists, sociologists and the general reader.

PLANET EARTH—Karl Stumpff, transl. from



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German by Philip Wayne—*Univ. of Mich. Press*, 191 p., illus., \$5. About our planet, its movements, structure, size and shape, and its relation to the rest of the universe.

THE PSYCHIATRIC AIDE: A Textbook of Patient Care—Alice M. Robinson, foreword by Walter E. Barton—*Lippincott*, 2nd ed., 200 p., illus. by author, \$3.50. Concerns itself primarily with the relationships between people and the attitudes that are essential tools in modern psychiatric treatment.

RUSSIAN-ENGLISH BIRD GLOSSARY—J. Munro MacLennan—*Dept. of Northern Affairs & Nat. Resources (Queen's Printer, Ottawa)*, 94 p., \$2.50. Of value to translators, biologists and students.

SATELLITES, SCIENCE, AND THE PUBLIC—*Survey Research Center, Univ. of Mich.*, 57 p., paper, \$1. Findings of a National Survey on the Public Impact of Early Satellite Launchings, made for the National Association of Science Writers.

SCIENCE NEWS 51—Archie and Nan Clow, Eds.—*Penguin*, 128 p., illus., paper, 65¢. Articles on liquid helium, cacao, electroplating, high speed photography, and others.

SCIENCE PROGRAM, 86TH CONGRESS—Subcommittee on Reorganization and International Organizations, Hubert H. Humphrey, Chmn.—*Committee on Govt. Operations, U. S. Senate*, 172 p., paper, free upon request direct to Committee, New Senate Bldg., Washington 25, D. C.

A SCIENCE READER—Lawrence V. Ryan, Ed.—*Rinehart*, 308 p., paper, \$1.95. Text for courses in scientific writing.

THE SURGEON'S TALE: The Story of Modern Surgery—Robert G. Richardson—*Scribner*, 278 p., illus., \$4.95. History of the advances of surgery told by a surgeon for the general as well as the professional reader.

TRANSISTOR PHYSICS AND CIRCUITS—Robert L. Riddle and Marlin P. Ristenbatt—*Prentice-Hall*, 428 p., \$10. Non-mathematical treatment of the operation and design of transistor circuits, requiring only high school trigonometry and algebra.

TRANSLATIONS OF RUSSIAN GAME REPORTS, Vol. 3: Arctic and Red Foxes, 1951-55—Canadian Wildlife Service—*Dept. of Northern Affairs and National Resources (Queen's Printer, Ottawa)*, 214 p., paper, \$1.

THE WEASEL FAMILY—Charles L. Ripper—*Morrow*, 64 p., illus. by author, \$2.50. Introduces children to the weasel, the skunk, the mink, the otter, the marten, the wolverine and the badger.

WHAT IS SPACE?—Matthew F. Vessel and Herbert H. Wong—*Fearon Publishers*, 14 p., illus., paper, 75¢. Definition and demonstrations of space terms, chart of earth's atmosphere, and other material useful to the science teacher.

WHOOPIING CRANE—Robert M. McClung—*Morrow*, 64 p., illus. by Lloyd Sanford, \$2.50. The story of the rare whoopers told for children.

Science News Letter, April 18, 1959

Do You Know

Light fog, clouds or thin clothing do not filter burning sun rays.

Hard and stale bread is not caused by loss of moisture, but by the aging of part of the starch system.

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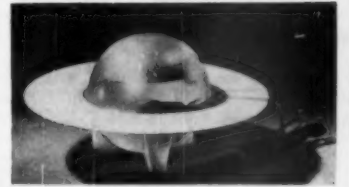


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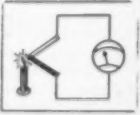
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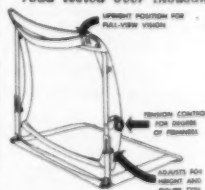
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MEDICINE

Ulcer Patients Aided

► A COLD toy balloon may mean the difference between life and death for patients with severe bleeding of the small intestine, stomach or esophagus.

Duodenal ulcer patients, in particular, have been aided by the new technique. This is one of the new medical developments reported in the *Journal of the American Medical Association* (April 4).

More than 20 patients have been treated

so far for "unrelenting hemorrhages" with a system of balloons and tubes that circulates a cool liquid in the stomach. In most cases bleeding was either stopped completely or slowed down, a team of researchers from the University of Minnesota Medical Center reports.

Earlier observations that cooling laboratory animals slowed down their gastric digestion considerably provided the basis

for the new technique. Where the digestive activity of the gastric juice is responsible for continued bleeding and erosion of the stomach or intestinal lining, this treatment may be used, the researchers say.

Such cases of massive vomiting of blood caused by gastrointestinal bleeding should not be treated with this cold balloon technique if cancer, abnormal blood conditions or other "miscellaneous disorders" are suspected.

Drs. Owen H. Wangenstein, Harlan D. Root and Peter A. Salmon, and Ward O. Griffen Jr. described the new technique and its uses.

Other medical research reported in the *Journal* include details of a new drug for treating hypertension and the development of a line of "functional fashions" for the physically handicapped.

The new drug, a derivative of Rauwolfia, does not have as many or as severe bad side effects as Rauwolfia and its other derivatives. The Galveston, Texas, researchers who gave the drug to patients with essential hypertension report only four cases of "relatively minor" intolerance to the drug. Drs. George R. Herrmann, Elmer B. Vogelpohl, Milton R. Hejmanick and James C. Wright, of the University of Texas Medical Branch, made the studies with syrosingopine as the new drug is called.

A top fashion designer, in cooperation with the New York University-Bellevue Medical Center's Institute of Physical Medicine and Rehabilitation, has come to the aid of the physically handicapped. Special garments have been designed and are now available through Clothing Research, Inc., of New York. The garments combine good looks with such features as special closings, pockets, pads and pleats, Dr. Howard A. Rusk and Eugene J. Taylor report.

Science News Letter, April 18, 1959

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WHO IS EDMUND C. BERKELEY? Author of "Giant Brains or Machines That Think," Wiley 1949, 270 pp. (15,000 copies sold); Author of "Computers: Their Operation and Applications," Reinhold, 1956, 366 pp.; Editor & Publisher of the magazine, *Computers and Automation*; Maker and Developer of small robots; Fellow of the Society of Actuaries; Secretary (1947-53) of the Association for Computing Machinery; Designer of all the Tyniacs and Brainacs, more than half of the 33 Geniacs (1955); Designer of the patented Multiple Switch Disc and other features in the 1955 Geniac kit.

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New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 983. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

HI-FI POCKET TAPE RECORDER is completely transistorized and operates on one battery. Weighing only three pounds and coming with a full set of optional accessories, the recorder is specifically intended for radio and television engineers and performers as well as reporters who need a small recorder.

Science News Letter, April 18, 1959

PORTABLE CHARCOAL GRILL has an 8-by-12-inch cooking area and comes charcoal packed and ready to light. It will hold eight hamburgers or 16 frankfurters. The grill has folding legs and may be used over and over. One firing last two hours.

Science News Letter, April 18, 1959

STATIC INVERTER UNIT enables vacationers and picnickers to plug portable television sets, bottle warmers, electric blankets or tape recorders into a car's dashboard. The unit uses transistor circuits and magnetic components to convert 6- or 12-volt DC battery current to 115 volt, 60 cycle AC power, furnishing the equivalent of 100 or 200 watts.

Science News Letter, April 18, 1959

SOAP DISH AND BRUSH of polyethylene, shown in the photograph, is a small ridged soap tray supported on resilient bristles. The tray section also serves as back



and handle for the bristles, making a shampoo brush for scalp massage. Available in different colors, the dish may be used bristle side up so air reaches the soap to dry it quickly.

Science News Letter, April 18, 1959

MOBILE WORK SHOP of unitized, welded steel has a telescopic work-platform, battery, bench and pipe vises, and a large 16-drawer cabinet. The hand-winch-operated work platform has a raised height of

ten feet and a lowered height of six feet. For maintenance, repair and overhead assembly, the unit transports 2,000 pounds of tools, materials and equipment.

Science News Letter, April 18, 1959

PAINT BRUSH BAG with zipper flange hermetically stores a wet paint brush so that paint solvents cannot evaporate and make the brush stiff. Available in different sizes, the plastic bag is especially useful to those who paint for only short periods at a time.

Science News Letter, April 18, 1959

WATERLESS HAND CLEANER containing lanolin comes pressure-packaged for on-the-spot hand cleaning. The push-button aerosol cleaner provides a controlled flow of scented cleaner for removal of grime, grease, tar, paint, ink, adhesives, putty and dirt.

Science News Letter, April 18, 1959

RUBBER PASTE in squeeze-type applicator can be used in caulking, insulating, waterproofing, etc. It bonds to rubber, metal, wood, glass, plastics, porcelain and fabrics, and dries and sets within a few hours into durable, pliant elastic rubber. It has high tensile strength and good resistance to weather, sunlight, oil, water and chemicals.

Science News Letter, April 18, 1959



Nature Ramblings



By HORACE LOFTIN

► **THE NEW-BORN** bison swayed uneasily on its feet, innocent of the danger surrounding it.

The big cow bison pawed the ground and glowered at the wolf pack that stood before them. The foremost of the wolves moved in quickly, as if to separate the calf from its mother. But with a deft charge, the bison caught the wolf on the points of its horns, lifted it high and dashed its dying body to the ground. After another attack and another casualty, the wolves left the cow and calf in peace.

Horns as a weapon of defense and offense first appeared among the vertebrate animals with the dinosaurs. A few modern reptiles, such as the horned "toads" of the American Southwest still have horn-like structures. But in general, horns are peculiar to mammals, especially those with hoofs.

A distinctive feature of a true horn is that it is derived from the skin. Thus, the

What About Horns?



bony antlers of the deer family are technically not horns at all. The hollow horns of bison, antelope, sheep and cattle, on the other hand, are made up of a hard layer of tissue derived from the skin (epidermis), resting on a core of living bone which projects from the skull.

Another typical difference between antlers and horns is that the antlers are usually branched and are shed regularly, to be re-

placed by a complete new set of antlers. True horns are generally unbranched and there is only one set through life.

There are several variants among the "horns" of animals that do not fit the picture of the typical hollow horn.

One of the most striking of these is the adornment of the pronghorn antelope of the western United States. This "pronghorn" has the general structure of the hollow horn, but it is both branched and shed annually. Then there is the giraffe, whose "horns" are structurally like antlers but are never shed.

The rhinoceros ("rhino" means nose, "ceros" means horn) sports still another kind of horny appendage. This terrible weapon is made up entirely of a compact mass of fiber-like material originating from skin tissue. However, unlike the typical hollow horn, it has no bony core. The African rhino has a single horn, while the Indian rhino bears two of them, one behind the other.

Science News Letter, April 18, 1959

